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NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

DAVIDSON COUNTY

THOROUGHFARE PLAN

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1984

THOROUGHFARE PLAN

for

DAVIDSON COUNTY, NORTH CAROLINA

Prepared by the:

Thoroughfare Planning Unit
Planning and Research Branch
Division of Highways
N. C. Department of Transportation

In Cooperation with:

The County of Davidson
The Federal Highway Administration
U. S. Department of Transportation

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TABLE OF CONTENTS

CHAPTER		PAGE
I.	INTRODUCTION	1
II.	COUNTY THOROUGHFARE PLANNING PRINCIPLES . . .	2
III.	URBAN THOROUGHFARE PLANS IN DAVIDSON COUNTY .	8
IV.	DAVIDSON COUNTY-POPULATION, LAND USE, AND TRAFFIC	9
V.	THOROUGHFARE PLAN	29
VI.	IMPROVEMENT PRIORITIES	33
VII.	IMPLEMENTATION	38
APPENDIX A -	THOROUGHFARE TABULATIONS, RECOMMENDATIONS AND TYPICAL CROSS SECTONS	A-1
APPENDIX B -	RECOMMENDED DEFINITIONS AND DESIGN STANDARDS FOR SUBDIVISION ORDINANCES . .	B-1

LIST OF FIGURES

FIGURE		PAGE
1.	IDEALIZED THOROUGHFARE PLAN	4
2.	SCHEMATIC ILLUSTRATION OF FUNCTIONALLY CLASSIFIED RURAL HIGHWAY NETWORK	6
3.	GEOGRAPHIC LOCATION OF DAVIDSON COUNTY	10
4.	SIGNIFICANT LAND USE ELEMENTS	13
5.	HISTORIC AND PROJECTED ADT VOLUMES	19
6.	PERSONS PER VEHICLE TRENDS FOR NORTH CAROLINA AND DAVIDSON COUNTY	21
7.	DEFICIENT BRIDGES IN DAVIDSON COUNTY	27
8.	RECOMMENDED THOROUGHFARE PLAN	31

LIST OF TABLES

TABLE		PAGE
1.	RURAL SYSTEM ROAD MILEAGE DISTRIBUTION	5
2.	HISTORICAL AND PROJECTED POPULATION TRENDS FOR DAVIDSON COUNTY	12
3.	DAVIDSON COUNTY LAND USE	12
4.	MINIMUM LEVELS OF SERVICE FOR ROADS AND HIGHWAYS .	16
5.	MINIMUM TOLERABLE LANE WIDTHS	17
6.	DEFICIENT BRIDGES IN DAVIDSON COUNTY	25
7.	ENVIRONMENTAL CONSIDERATIONS	34
8.	BENEFITS EVALUATION OF DAVIDSON COUNTY	35
9.	IMPROVEMENT PRIORITIES AND COST ESTIMATES	36
10.	IMPROVEMENT PRIORITIES FOR DEFICIENT BRIDGES IN DAVIDSON COUNTY	37

I. INTRODUCTION

The economic growth of a region is largely dependent on how efficiently the transportation system can handle travel demands. If the system fails to provide the means for quick and convenient transportation of people and goods, the region's economic growth becomes stagnated and fails to reach its full potential. It is necessary that such a system not only meet existing travel demands, but also that it keep pace with the development of the region. This report will set forth a system of thoroughfares to serve the anticipated traffic and land development needs of Davidson County for the next twenty years. In the development of the system of thoroughfares, certain priorities shall be established based on maintenance needs, inadequate bridges, poor horizontal and vertical alignment, and insufficient present and future capacity.

The system of thoroughfares proposed was developed following the basic principles of thoroughfare planning as described in Chapter II of this report. Major thoroughfares were located based upon existing and anticipated travel demands, existing streets, existing and anticpated land developments, topographic conditions, and field investigations. The plan advocates those improvements which are felt to be essential for proper traffic circulation within the current planning period (1982-2005). The Davidson County Thoroughfare Plan does not attempt to modify the thoroughfare plans adopted for the Lexington and Thomasville urban area.

Some of the proposed improvements in the county plan will be primarily the responsibility of the North Carolina Department of Transportation. However, Davidson County can provide assistance in the implementation of the plan through subdivision regulations and zoning ordinances. With the different governmental agencies involved in developing the thoroughfare system, coordination of activities is of prime importance. Thus, it will be desirable for the plan to be formally adopted by both the County Commissioners and the North Carolina Board of Transportation to serve as a mutual official guide in providing a well coordinated, adequate, and economical major street system.

II. COUNTY THOROUGHFARE PLANNING PRINCIPLES

Purpose of Planning

There are many benefits to be gained from thoroughfare planning, but the primary objective is to assure that the road system will be progressively developed in a manner that will adequately serve future travel desires. Thus, the cardinal concept of thoroughfare planning is to make provisions for street and highway improvements so that when needs arise, feasible opportunities to make improvements exist.

Streets, roads, and highways perform two primary functions. They provide traffic service and land service. When combined, these two functions are basically incompatible. This conflict is not serious if both traffic and land service demands are low. When traffic volumes are high, however, access conflicts created by uncontrolled and intensely used abutting property result in intolerable traffic flow friction and congestion.

The major benefits derived from thoroughfare planning are: (1) Each road or highway can be designed to perform a specific function and to provide a specific level of service. This permits savings in rights-of-way, construction, and maintenance costs; protects residential neighborhoods; and encourages stability in travel and land use patterns. (2) Local officials are informed of future improvements. Developers can design subdivisions to function in a non-conflicting manner. School and park officials can better locate their facilities. Damage to property values and community appearance that is sometimes associated with road improvements can be minimized.

County Thoroughfare Planning Concept

The underlying concept of the thoroughfare plan is that it provides a functional system of streets, roads and highways which permit travel from origins to destinations with directness, ease, and safety. Different elements in the system are designed and called on to perform specific functions and levels of service, thus minimizing the traffic and land service conflict.

Within the county plan, elements are considered to be either urban or rural. In the urban planning area, the local municipality generally has planning jurisdiction. Outside the urban planning area, the county has planning jurisdiction. In those urban areas where no urban thoroughfare plan has been developed, elements are generally considered to be rural and under the planning jurisdiction of the county. When a thoroughfare plan is developed for an urban area that has not previously had a plan, then the area

defined by that plan would be considered urban and come under the planning jurisdiction of the municipality.

Within the urban and rural systems, thoroughfare plan elements are classified according to the specific function which they are to perform. A discussion of the elements and functions of the two systems follows.

Urban Thoroughfare Classification System

In the urban thoroughfare plan, elements are classified as either local access streets, minor thoroughfares or major thoroughfares. Local access streets which may be further classified as residential, commercial, or industrial streets are designed only to provide access to abutting property. Minor thoroughfare are more important streets in the urban system and are designed to collect traffic from local access streets and carry it to the major thoroughfare system. They may also serve abutting property and serve some minor through traffic movements. The major thoroughfares are the primary traffic arteries of the urban area providing for traffic movements wthin, around, and through the area.

Due to the limited amount of detail that can be shown on a county thoroughfare plan, only urban major thoroughfares are shown. A coordinated system of major thoroughfares which is most adaptable to desire lines of travel within an urban area and reflected in most urban area thoroughfare plans is the radial-loop system. The radial-loop system includes radials, crosstowns, loops, and bypasses. Radial thoroughfares provide for travel from points outside to major destinations inside the urban area. Crosstown thoroughfares provide for traffic movements across the central area and around the central business area (CBD). Loop thoroughfare provide for lateral travel movements between suburban areas. Bypasses are designed to carry non local traffic around or through the area. Occassionally a bypass with low through traffic volumes can be designed to function as a portion of an urban loop. The radial-loop major thoroughfare system concept and concept of functionally classified urban street system are illustrated in Figure 1.

Rural Thoroughfare Classification System

The rural system consists of those facilities outside the urban thoroughfare planning area boundaries. They are classified into four major systems: principal arterials, minor arterials, major and minor collector roads, and local roads. Table 1 indicates generally accepted statewide mileage on these systems.

FIGURE 1

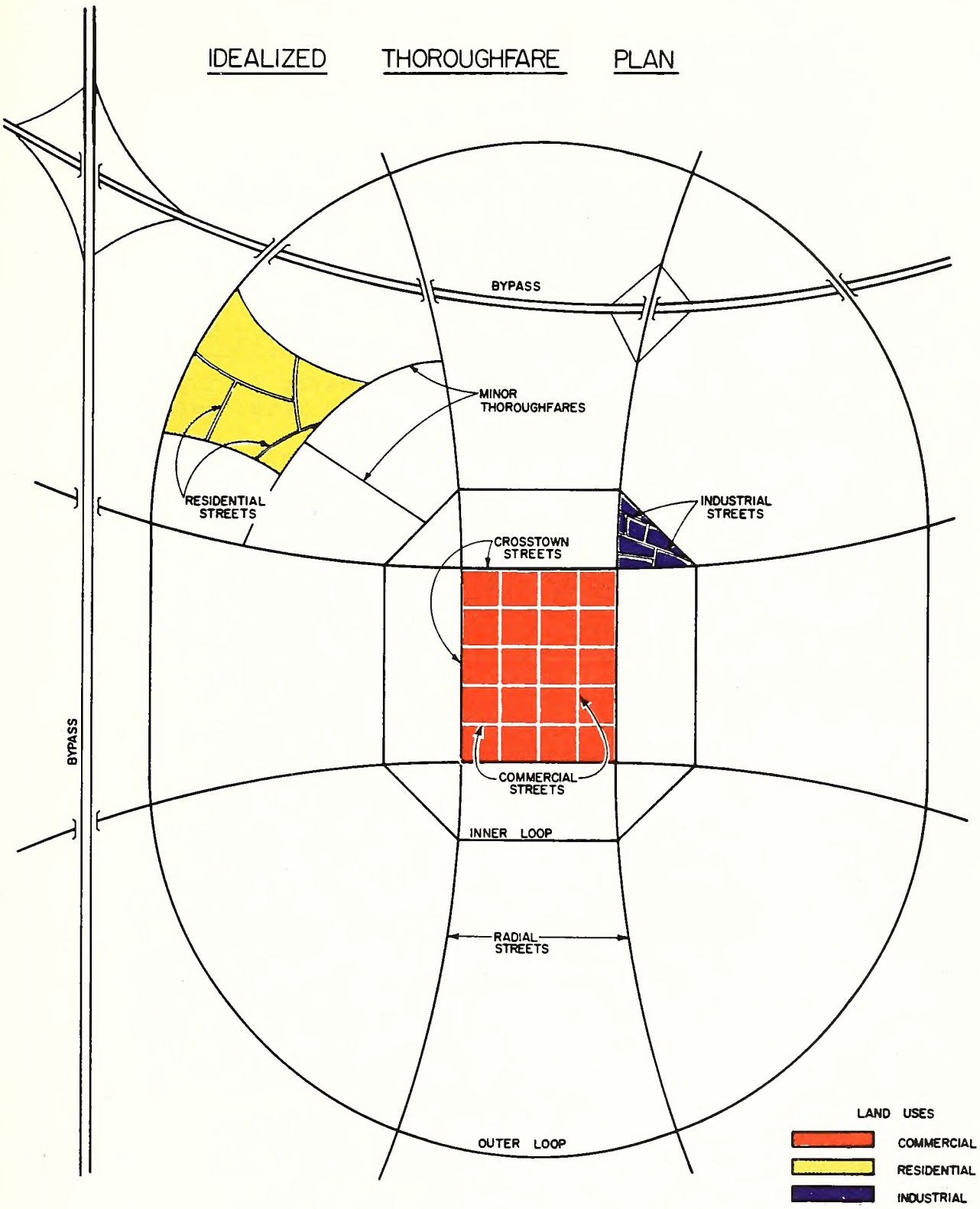

IDEALIZED THOROUGHFARE PLAN
BYPASS
MINOR THOROUGHFARES
RESIDENTIAL STREETS
INDUSTRIAL STREETS
CROSSTOWN STREETS
COMMERCIAL STREETS
INNER LOOP
RADIAL STREETS
OUTER LOOP
BYPASS
LAND USES
COMMERCIAL
RESIDENTIAL
INDUSTRIAL

Table 1

Rural System Road Mileage Distribution	
Systems	Percentage of Total Rural Miles
Principal arterial system	2- 4
Principal arterial system plus minor arterial road system	6-12
Collector (Major plus minor) road system	20-25
Local road system	65-75

Figure 2 gives a schematic illustration of a functionally classified rural highway system.

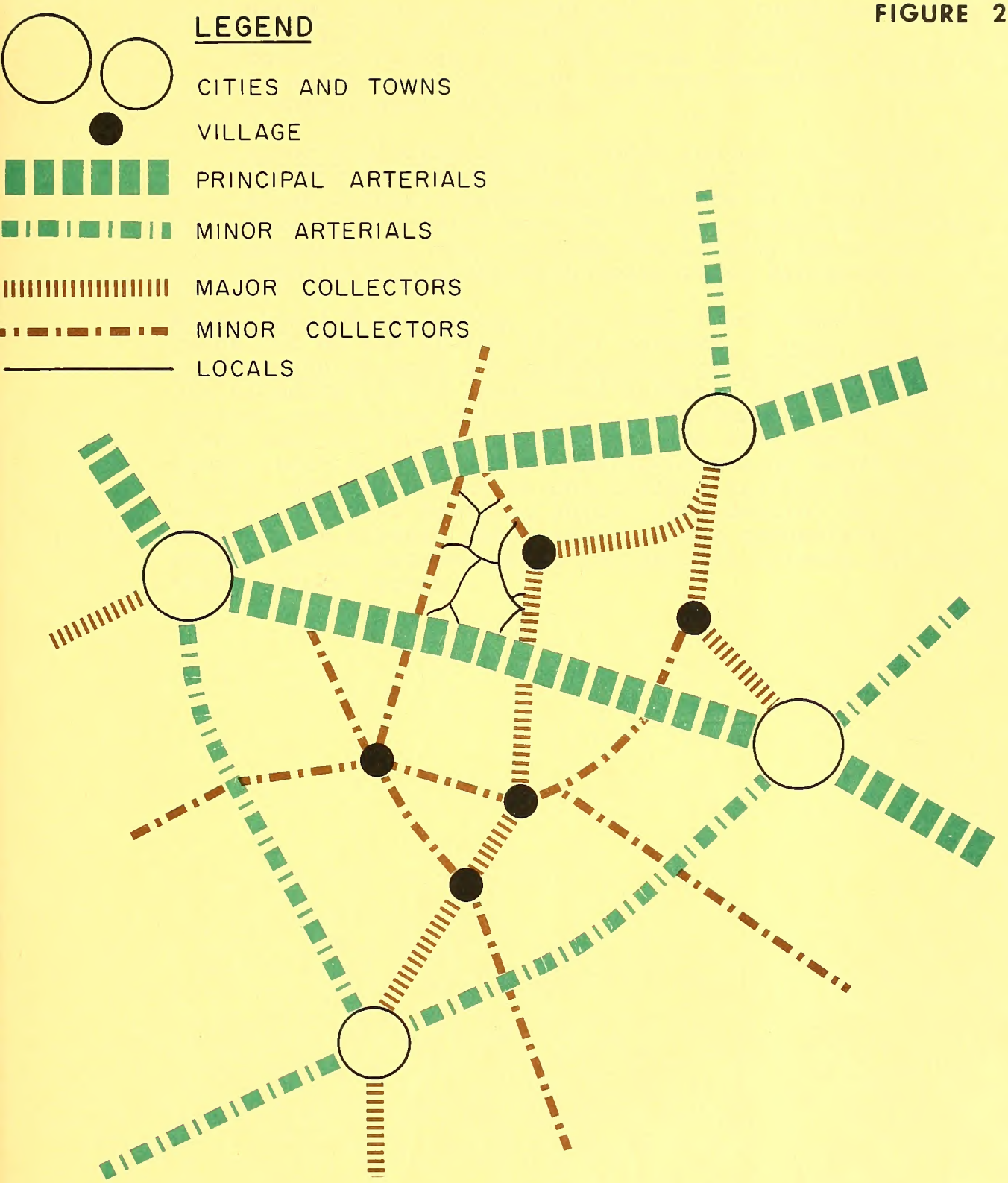
Rural Principal Arterial System: The rural principal arterial system consists of a connected network of continuous routes which serve corridor movements having trip lengths and travel density characteristics indicative of substantial statewide or interstate travel. The principal arterial system should serve all urban areas of over 50,000 population and a large majority of those with a population greater than 5000. The Interstate System constitutes a significant portion of the principal arterial system.

Rural Minor Arterial System: The minor arterial system in conjunction with the principal arterial system forms a network which links cities, larger towns, and other major traffic generators such as large resorts. The minor arterial system generally serves interstate and intercounty travel and serves travel corridors with trip lengths and travel densities somewhat less than the principal arterial system.

Rural Collector Road System: The rural collector routes generally serve intracounty travel rather than statewide travel and constitute those routes on which the predominant travel distances are shorter than on the arterial routes. This system is subclassified into major collector roads and minor collector roads.

Major Collector Roads: These routes (1) provide service to the larger towns not directly served by the higher systems and to other traffic generators of equivalent intracounty importance, such as consolidated schools, shipping points, county

FIGURE 2



SCHEMATIC ILLUSTRATION
OF FUNCTIONALLY CLASSIFIED
RURAL HIGHWAY NETWORK

parks, important mining and agricultural areas, etc; (2) link these places with nearby larger towns or cities, or with routes of higher classification; and (3) serve the more important intra-county travel corridors.

Minor Collector Roads: These routes (1) collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road; (2) provide service to the remaining smaller communities; and (3) link the locally important traffic generators with their rural hinterland.

Rural Local Road System: The local roads comprise all roads not on one of the higher systems. Local residential subdivision streets and residential collector streets are elements of the local road system. Local residential streets are either cul-de-sacs, loop streets less than 2,500 feet in length, or streets less than one mile in length that do not connect thoroughfares or serve major traffic generators and do not collect traffic from more than one hundred dwelling units. Residential collector streets are streets which serve as the connecting street system between local residential streets and the thoroughfare system .

III. URBAN THOROUGHFARE PLANS IN DAVIDSON COUNTY

Thoroughfare plans are developed for urban areas and counties to assist officials in the development of the most logical and appropriate street system to fulfill the existing and future travel demands. The municipalities and county must cooperate as a team to develop an efficient system for travel within the county.

A Thoroughfare Plan was develeoped in 1978 with revisions made in 1980 for the urban area of Lexington in Davidson County (Appendix B).

High priority was given to the following projects in Lexington:

1. US 29/70 and Greensboro Road Intersection
2. Linwood Road Bridge
3. NC 8 Connector
4. NC 8 and US 52 North widening
5. US 64 East and West widening
6. Salisbury Road widening
7. Raleigh Road widening

A Thoroughfare Plan was developed in 1980 for the Thomasville urban area in Davidson County as part of the High Point-Thomasville-Archdale-Jamestown Transportation Study (Appendix B). The plan was adopted by the City of Thomasville and the North Carolina Department of Transportation in July, 1980.

High priority was given to the following projects in Thomasville:

1. "West Belt" Connector
2. Bryant Street widening
3. Cloniger Street
4. Colonial Drive
5. County Line Road
6. Cox Avenue Relocation

For further details and other plan considerations, refer to the Lexington Thoroughfare Plan Report, 1979, and the High Point Urban Area Transportation Study, "Report on The Adopted Plan", August 1, 1981, North Carolina Department of Transportation. Appendix B of the reports contain both a map of the Lexington and Thomasville plans and a detailing of the street systems.

IV. DAVIDSON COUNTY - POPULATION, LAND USE, AND TRAFFIC

Davidson County is located in the western portion of the Piedmont Triad region of North Carolina. As shown in Figure 3, the county is bordered by Forsyth County to the North, Davie and Rowan County to the west, Montgomery County to the South, and Randolph and Guilford County to the East. The major highways are I-85, US 64, US 52, NC 8, US 29-70, NC 49, NC 68, NC 150, NC 109, and NC 47. Rail Service is provided by Southern Railway, Winston-Salem Southbound Railway and High Point-Thomasville-Denton Railroad. Commercial airline service is available at Winston-Salem in Forsyth County and Greensboro in Guilford County.

Davidson County is divided into Seventeen townships; Abbotts Creek, Alleghany, Arcadia, Boone, Conrad Hill, Cotton Grove, Emmons, Hampton, Healing Spring, Jackson Hill, Lexington, Midway, Reedy Creek, Silver Hill, Thomasville, Tyro, and Yadkin College. Lexington, the county seat is located centrally in the County. The other urban center in the County is Thomasville located at the Davidson-Randolph County line. The Town of Denton is located in the southern portion of the County.

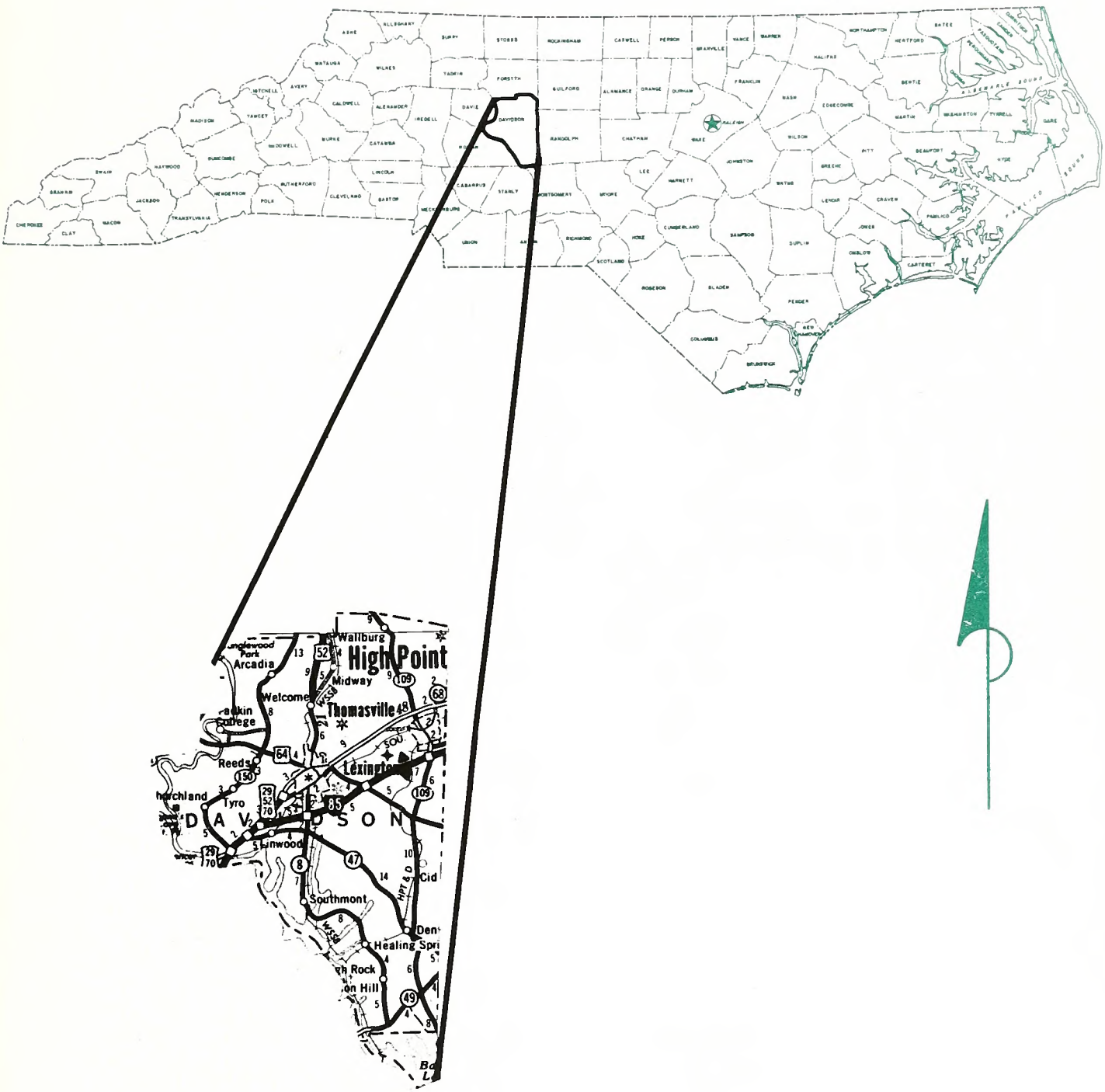
The mean elevation of the County is 750 feet above sea-level. The topography consists mainly of gently rolling hills. A portion of the Uwharrie Mountain Range extend across the southern portion of the County. Most of the steep slopes are encountered near streams and rivers and most of the very flat land consists of periodically flooded stream bottoms. The County is blessed with ample surface water. Creeks and streams flow throughout the County into the Yadkin River which forms High Rock Lake to the south.

Factors Affecting Transportation

Thoroughfare planning is a process whose objective is to develop a system of transport which will enable people and goods to travel safely and economically. To determine the needs of a county, the factors of population, land use, and traffic must be examined. To properly plan for the transportation needs of a county, it is important to understand and describe the type and amount of travel which takes place in that area, and also to clearly identify the goals and objectives to be met by the transportation plan.

In order to fulfill the objectives of an adequate 20-year thoroughfare plan, reliable forecasts of future travel characteristics must be achieved. Such forecasts are possible only when the following major items are carefully analyzed: (1) historic and potential population changes; (2) significant trends in the economy; (3) character and

GEOGRAPHIC LOCATION



DAVIDSON COUNTY

FIGURE 3

intensity of land development; and (4) motor vehicle registration and usage. Additional items that vary in influence include the effects of legal controls such as zoning ordinances and subdivision regulations, availability of public utilities and transportation facilities, and topographic and other physical features of the urban area.

Population Trends

The volume of traffic on a section of roadway is a function of the size and location of the population it serves. An analysis of the population is one of the first steps the transportation planner does. The analysis of past trends allows the planner to estimate future population and traffic which it generates with some degree of reliability.

The population of Davidson County reflects a steady growth from 29,404 persons in 1910 to 47,865 persons in 1930. The larger increase came from 1920 to 1930 with a 36 percent increase in population. This could be partially attributed to the industrial development around the cities of Lexington and Thomasville. Also, increases from 1950 to 1980 were substantial due to the increases in industrial development. More recent development was spurned by a countywide water and sewer system. This growth rate, which is much larger than the average predicted for North Carolina, is consistent with expected growth in the Piedmont Crescent Region of the state.

A least square line analysis of past population growth was used to estimate 1990, 2000, and 2005 population for Davidson County. A least square line is a straight line calculated to fit a series of data such that the sum of the squared deviations of the data points from the line is a minimum. Using this method, the 2000 and 2005 population projections were calculated to be 134,800 and 139,750 persons respectively (See Table 2).

Land Use

The generation of traffic on a particular street is very closely related to the utilization of adjacent land areas. Some type of land uses generate much more traffic than others. For example, a commercial or retail area such as a shopping center would generate (or attract) much larger volumes of traffic than say a residential area. The attraction between different land uses varies with the intensity of development and the distance between those developed areas. It, therefore, becomes necessary to designate land uses by type for the purposes of transportation planning. An analysis of the distribution of existing land uses serves as a basis for forecasting future land use needs and the resulting travel patterns.

TABLE 2

HISTORICAL AND PROJECTED POPULATION TRENDS FOR DAVIDSON COUNTY

YEAR	POPULATION	PERCENT CHANGE
1910	29,404	
1920	35,201	19.7
1930	47,865	36.0
1940	53,377	11.5
1950	62,244	16.6
1960	79,493	27.7
1970	95,627	20.3
1980	113,162	18.3
1990	124,736	10.2
2000	134,827	8.1
2005	139,760	3.6

TABLE 3

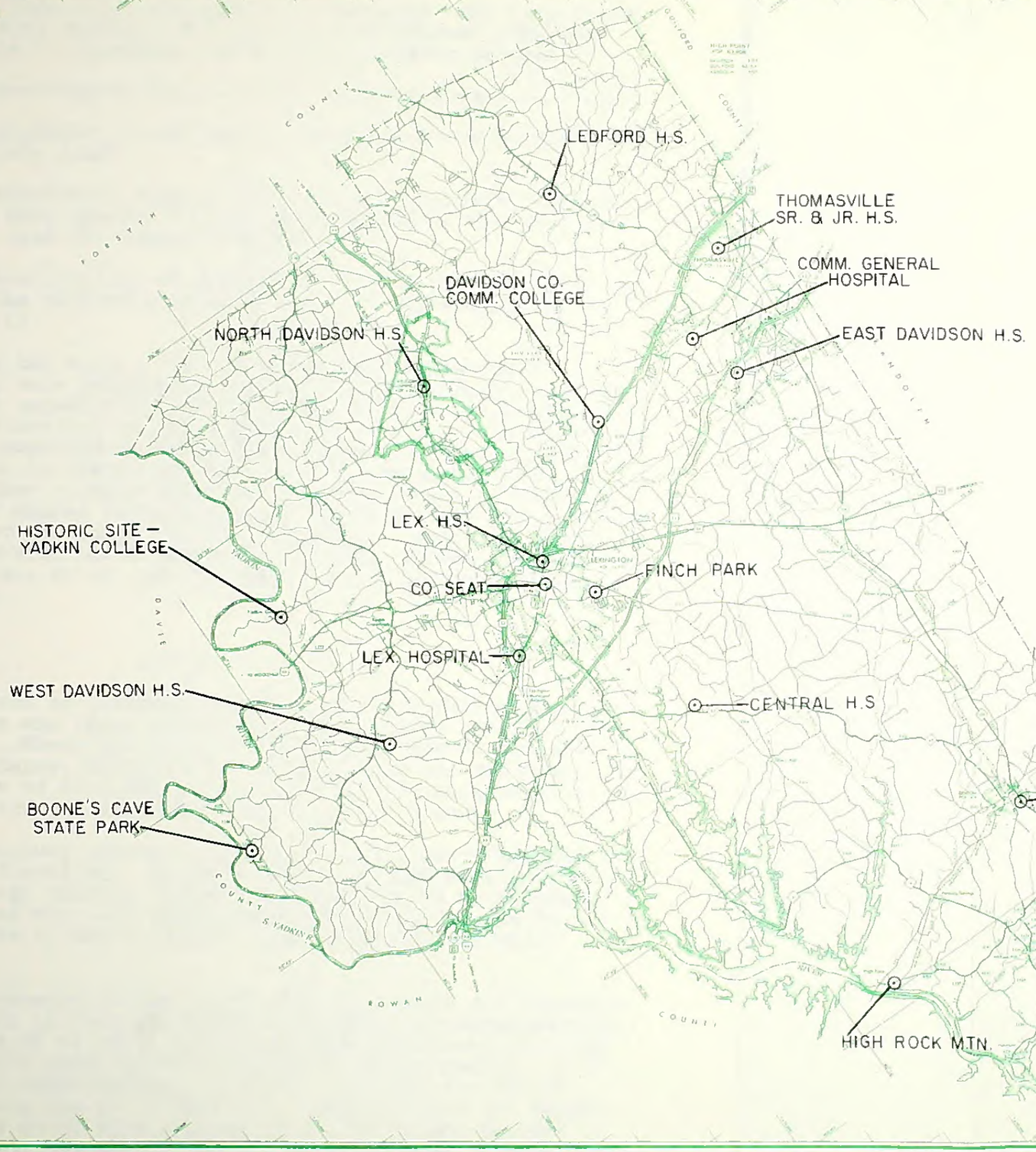
DAVIDSON COUNTY LAND USE

TYPE OF LAND	ACRES	PERCENT
Forest	178,100	51.0
Agriculture	112,900	32.3
Urban + Build up	37,800	10.8
Other	20,640	5.9
Total	349,440	100.00

Traffic

A comparison of 1970, 1975, and 1980 average annual daily traffic volumes (ADT) on selected major roads and highways in Davidson County is shown in Figure 5. Also shown are projections for the year 2005, assuming no changes to the existing street system are made. These projections were based on historical and anticipated population and economic growth patterns and land use trends.

Vehicle registration has increased at a much greater rate than population since 1940. The increase can best be shown by a graph depicting the change in the persons per vehicle ratio over a period of time. This ratio is obtained by dividing the total population of the area by the total number of vehicles registered in that area. Figure 6 shows this comparison for North Carolina and Davidson County, and includes projections to 2005. The results illustrate the transition from a non-automobile oriented society to one whose vitality is heavily dependent on the automobile. This



SIGNIFICANT LAND USE ELEMENTS

FIGURE 4

DAVIDSON COUNTY

NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - PLANNING AND RESEARCH BRANCH
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

change in life style has gradually occurred over many years, with the most dramatic difference being between 1940 and 1960. This is primarily due to the following reasons:

1) The post-depression increase in the standard of living.

2) The increase in population including the post World War II "baby boom".

3) The transition from an agricultural dominated society to a more diversfied one (less people on the farm, but more need for transportation).

4) The availability of automobile in the 1960's and 1970's and the banking credit to buy them (more cars, easier credit).

Since the early 1970's however, these reasons for purchasing more automobiles have had less influence and have led to the expectation that the person per vehicle rate will begin to stabilize as projected in Figure 6. This saturation effect is expected to stabilize trip-making characteristics of families in the middle and upper income categories due to the fact they already have the financial means to purchase a sufficient number of vehicles to satisfactarily serve their transportation needs. On the other hand, moderate growth in the trip making characteristics of lower income families is projected due to an expected improvement in their financial well-being.

System Deficiencies

Sections of Davidson County roads have deficiencies in lane widths and level of service, and problem accident locations. There are areas in which highways do not meet state standards, bridges that are obsolete and deficient, or in the case of accidents, have experienced worse than the state average for that particular type of highway.

The highway system in Davidson County has primarily two important functions: to serve abutting land uses and to serve through traffic in the heavily traveled north-south corridor and the ever increasing demands for access to the major cities in the Piedmont Crescent Section of North Carolina.

Improvements in the north-south corridors are underway at this time in North Carolina Department of Transportation projects on US 52 north from Lexington to welcome and I-85 from US 29-70 south of Lexington to Randolph County. Also, an eastwest improvement is needed to provide for future traffic along the US 64 corridor. Improvements are needed for bridges on SR 1713 (Hebron Church Road) and SR 2005 (Turner Road) because of the low weight limits and the daily school buses that use these facilities.

Capacity, Width and Alignment Deficiencies

North Carolina's standard for highway construction calls for 11 foot lanes on all highways with traffic volumes greater than 2000 ADT (average daily traffic) or design speeds greater than 50 miles per hour, including all primary arterials. A minimum lane width of 9 feet can be tolerated on collector roads with an ADT of less than 400 vehicles per day. Minimum level of service for minor collector roads dictate a 40 mph design speed during peak traffic conditions.

Design requirements for thoroughfares vary according to the desired capacity and level of services to be provided. Universal standards in the design of thoroughfares are not practical. Each road or highway section must be individually analyzed and its design requirements determined on the basis of amount and type of projected traffic, existing capacity, desired level of service, and available right-of-way.

The level of service is a function of the ease of movement experienced by motorists using the facility. The ability of a motorist to drive at a desired speed is dependent upon the physical design of the road; the amount and character of traffic control devices; the influence and character of traffic generated by abutting property; and imposed speed restrictions. The level of service is generally indicated by the overall travel speed experienced by traffic. Recommended minimum levels of service for roads and highways included in the proposed Davidson County Thoroughfare Plan are given in Table 4.

TABLE 4

MINIMUM LEVELS OF SERVICE FOR ROADS AND HIGHWAYS

FACILITY	OVERALL TRAVEL SPEED DURING PEAK TRAFFIC CONDITIONS
Major and Minor Arterials	50-55 MPH
Major Collector Roads	45-50 MPH
Minor Collector Roads	40 MPH

From the standpoint of driver convenience, ease of operation, and safety, it would be desirable to widen all existing roads and highways to provide a minimum lane width of 12 feet. However, when considering overall statewide needs and available highway revenues, it is found that these levels of improvement applied statewide would be impractical. It is necessary, therefore, to establish minimum tolerable widths for existing roads with respect to traffic demands which would be economically feasible. Table 5 gives the widths used in determining the existing lane deficiencies in the county.

TABLE 5			
MINIMUM TOLERABLE LANE WIDTHS (in Feet)			
ADT	Principal Arterials	Minor Arterials	Collectors
Over 2,000	11	11	11
400- 2,000	-	10	10
100-400	-	10	9
Below 100	-	-	9

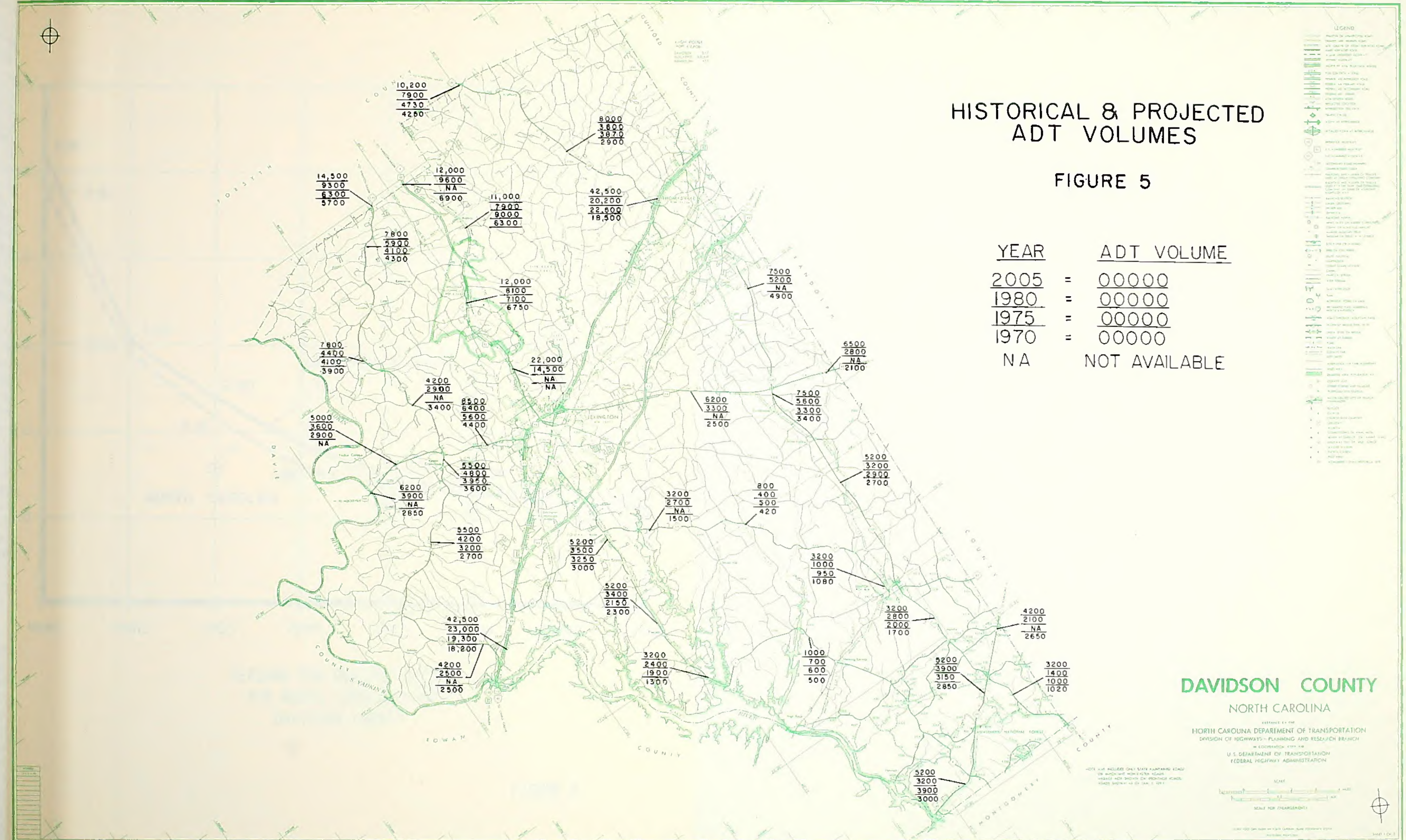
An analysis of highways in Davidson County was made to determine if the projected traffic (year 2005) would exceed the practical capacity of the system. The projected volumes are shown in Figure 5. Comparing the projected traffic to available capacities, it was anticipated that the following roads will be experiencing capacity related problems within the design period:

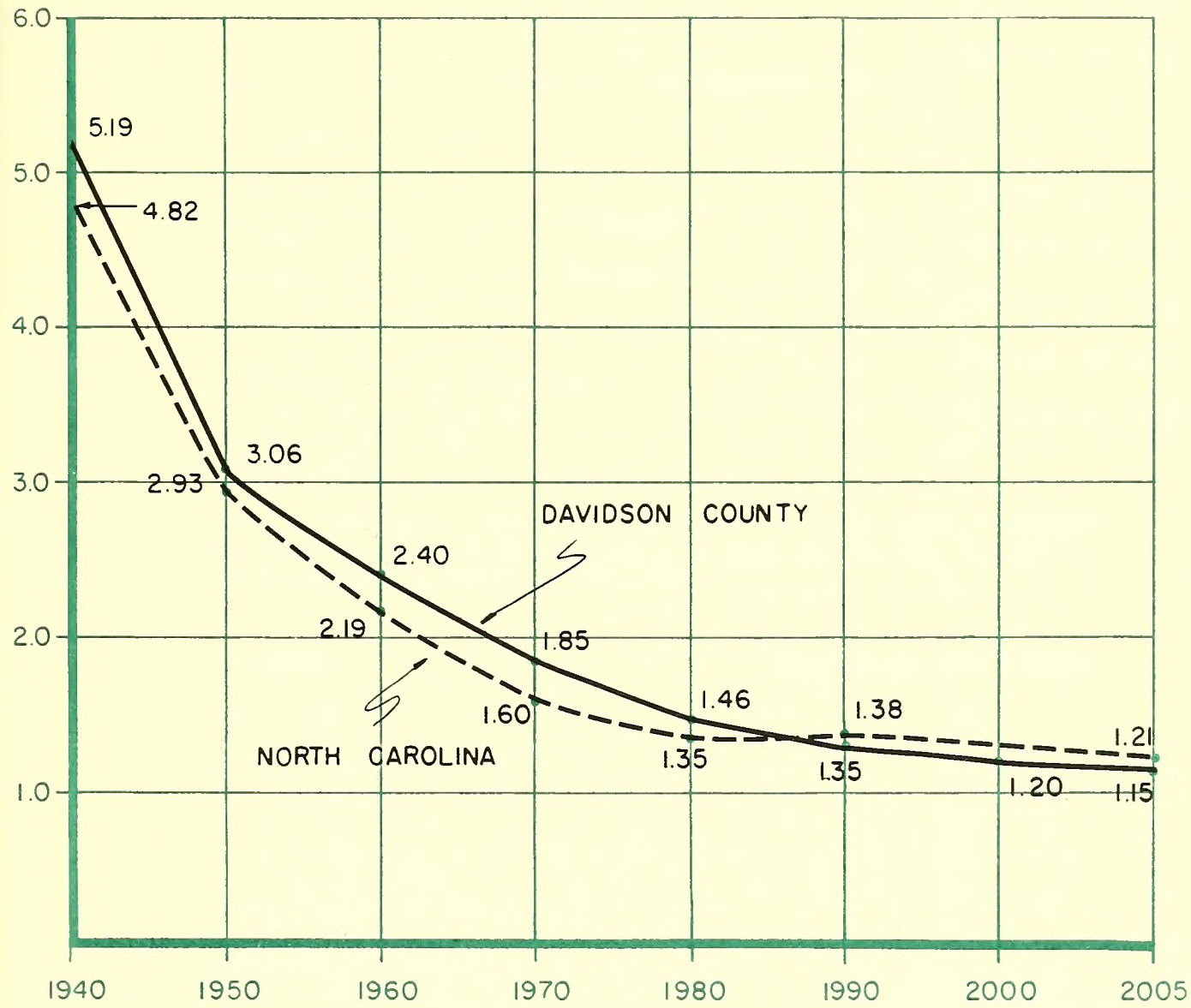
1. Old US 52 (Common NC 8) North of Lexington
2. US 64 From East of Lexington to SR 2010
3. NC 8 south of Lexington
4. NC 109 From Thomasville to Forsyth Co.
5. NC 150 From I-85 (TEMP) to Forsyth County
6. SR 2205 From I-85 to SR 2247

There are a number of major roads in the county that have substandard widths. Standards established in Table 4 were used in the analysis. The width needed to bring these roads up to standard are given as the recommended cross section. Because of the substantial cost of upgrading all secondary roads to standard, narrow widths may have to be tolerated until sufficient funds are available to provide for improvements.

Traffic Safety

Traffic accident records are of assistance in locating problem areas on the highway system. The 1981 Safety Program Listing, obtained from the Traffic Engineering Branch of the North Carolina Department of Transportation, lists 9 locations as high accident sections of roadway in the County. These locations are listed below, along with its ranking relative to other high accident locations in the State. A ranking of one (1) is the most hazardous location whether by the number of accidents or severity of injuries and property damage.


HISTORICAL & PROJECTED
ADT VOLUMES
FIGURE 5
YEAR ADT VOLUME
2005 = 00000
1980 = 00000
1975 = 00000
1970 = 00000
NA NOT AVAILABLE
DAVIDSON COUNTY
NORTH CAROLINA
HORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - PLANNING AND RESEARCH BRANCH
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION



PERSONS PER VEHICLE TRENDS
FOR NORTH CAROLINA AND
DAVIDSON COUNTY

FIGURE 6

	Concentration	Rank
1.	US 29-52 From SR 1297 to SR 1280 (Service Rd. to Service Rd.)	100 out of 383
2.	US 29-70 From SR 2022 to SR 1798 (Old US 29-70 to Old Greensboro Rd.)	109 out of 383
3.	US 29-70 From SR 1783 to SR 1881 (Thomasville City Dump Rd. to Service Rd.)	120 out of 383
	Intersections	
4.	US 64 at SR 1239 (Service Rd. at Shoaf Wayside)	12 out of 383
5.	SR 2055 at SR 2053 (Liberty Dr. at Blair Street)	28 out of 383
6.	US 64 at SR 2010-2403 (Holly Grove Rd.-Howard Black Rd.)	43 out of 383
7.	US 52 at SR 1457-1841 Arnold Rd.-City Lake Rd.)	73 out of 383
8.	US 29B-70B at 9th/Ave	102 out of 383
9.	NC 109 at SR 2060 (Vance Road)	207 out of 383

Traffic accident records for 1980 to 1982 were studied with the high accident locations (15 and above for three years) and number listed as follows:

	Location	Number of Accidents
1.	I 85 - US 29	15
2.	I 85 - SR 1297	15
3.	US 52 - SR 1472 (Dr. Zimmerman Rd.)	15
4.	NC 50 - SR 1453	15
5.	US 29 - US 29A	15
6.	US 52 - SR 1464 (Homer Leonard Rd.)	16
7.	US 29 - SR 2123 (National Highway)	16
8.	US 52 - SR 1468 (Center Church Rd.)	16
9.	US 64 - SR 1239 (Service Rd. at Shoaf Wayside)	16
10.	NC 109 - SR 1753 (Jessie Green Rd.)	16
11.	SR 2051 - SR 2054 (Unity Street-Trinity Street)	16
12.	US 29 - NC 68	17
13.	NC 8 - NC 47	17
14.	US 29 - US 29 B	18
15.	US 29 - SR 1232 (Sink Inn Rd.)	18

16.	NC 8 - SR 2212 (Fairview Dr.)	18
17.	NC 150 - SR 1192 (Old US 64)	18
18.	I 85 - NC 47	19
19.	SR 1147 - SR 1221 (Old US 29-70S-Tussey Rd.)	19
20.	US 29 - SR 1787 (Stone Rd.)	22
21.	NC 109 - SR 1798 (Old Greensboro Rd.)	23
22.	US 29 - SR 1770 (Albertson Rd.)	24
23.	US 52 - SR 1417 (Leonard Rd.)	24
24.	NC 150 - SR 1508 (Hickory Tree Rd.)	25
25.	US 29A - SR 1772 (Hasty School Rd.)	27
26.	US 64 - SR 2010 (Holly Grove Rd.)	28
27.	US 29 - SR 1147 (Old US 29-70 South)	29
28.	I 85 - NC 150	30
29.	NC 109 - SR 2184	32
30.	US 29 - NC 109	34
31.	US 29 - SR 1798 (Old Greensboro Rd.)	56

Bridge Conditions

Bridges are a vital and unique element of a highway system. First, they represent the highest unit investment of all elements of the system. Second, any inadequacy or deficiency in a bridge reduces the value of the total investment. Third, a bridge presents the greatest opportunity of all potential highway failures for disruption of community welfare. Finally, and most importantly, a bridge represents the greatest opportunity of all highway failures for loss of life. For these reasons, it is imperative that bridges be constructed to the same design standards as the system of which they are a part.

Congress enacted the National Bridge Inspection Program Standards on April 27, 1971, implementing the Federal Highway Act of 1968. These standards require that all structures defined as bridges located on any of the Federal-Aid Highway Systems be inspected and the safe load carrying capacity computed at regular intervals, not to exceed two years. A sufficiency index number has been calcuated for each bridge for the purpose of establishing eligibility and priority for replacement. The bridges with the highest priority are replaced as Federal-Aid Funds and State funds are made available. Additional funds have recently been provided by Congress for bridge replacement.

The North Carolina Bridge Maintenance Unit has been assisted by consultants in inspecting all bridges on the State Highway System. All bridges in Davidson County have been analyzed, rated, appraised, inventoried, and the resulting data has been reduced to a more readily useable form as a manangement tool.

A sufficiency rating was used in the analysis to determine the deficiency of a particular bridge. The sufficiency rating is a method of evaluating factors, which are indicative of bridge sufficiency to remain in service. Factors included, structural adequacy and safety, serviceability and functional obsolescence, essentiality for public use, type structure and traffic safety features. The result of this method is a percentage in which 100 percent would represent an entirely sufficient bridge and zero percent would represent and entirely insufficient or deficient bridge. A sufficiency rating of 50 or less qualifies for Federal Bridge Replacement funds.

Table 6 shows deficient bridges located on routes included in the thoroughfare plan.

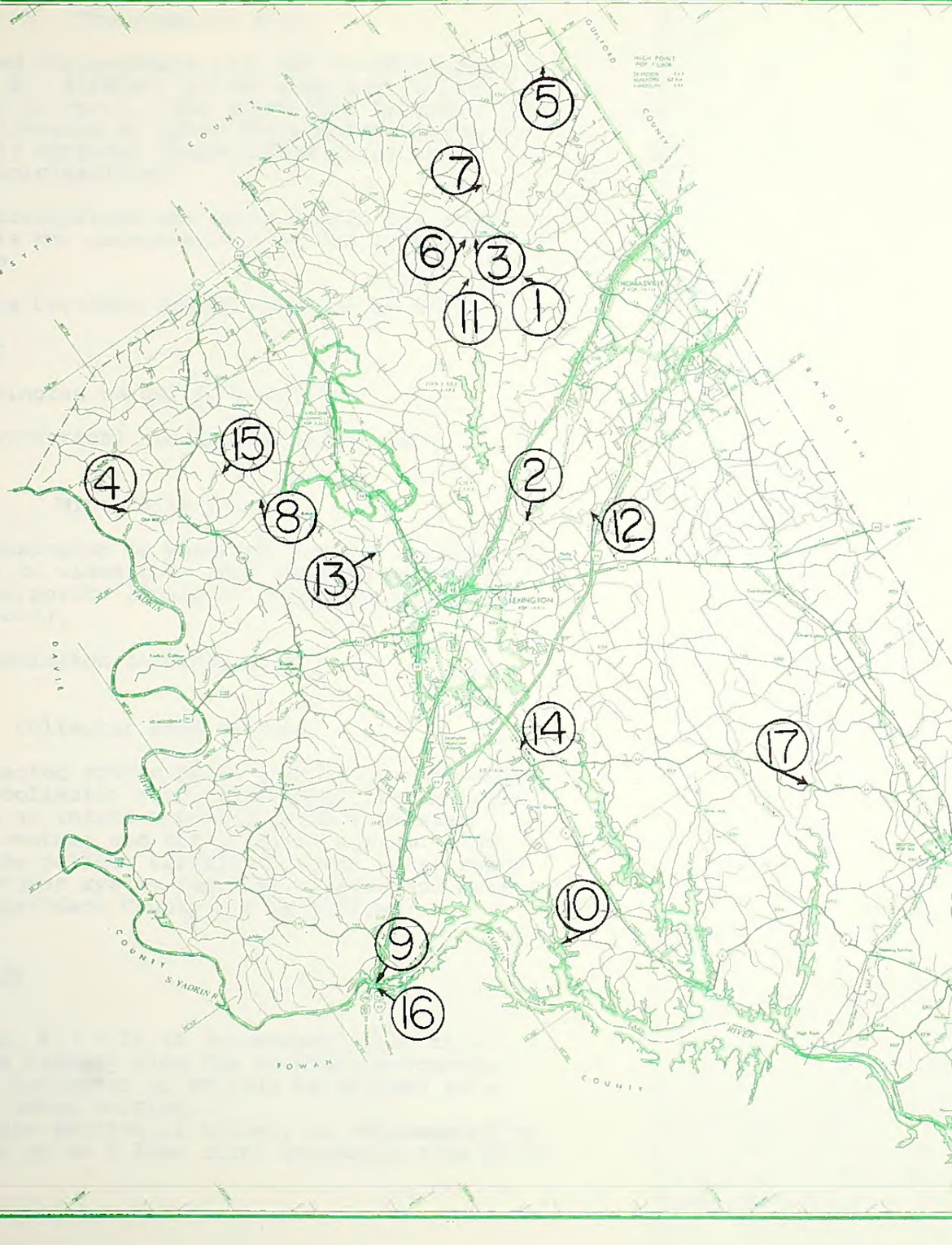
TABLE 6

DEFICIENT BRIDGES IN DAVIDSON COUNTY

MAP INDEX	SUFFICIENCY RATING %	LOCATION
1	16.9	SR 1800 @ Rich Fork Creek
2	18.8	*SR 2005 @ Rich Fork Creek
3	24.6	*SR 1700 @ Abbotts Creek
4	24.7	SR 1485 @ Muddy Creek
5	27.0	SR 1738 @ Rich Fork Creek
6	27.6	SR 1700 @ Abbotts Creek
7	27.8	SR 1755 @ Abbotts Creek
8	27.9	SR 1477 @ Reedy Creek
9	28.3	I-85 @ Southern RR
10	28.3	SR 1104 @ Swearing Creek
11	30.0	SR 1800 @ Abbotts Creek
12	31.5	SR 2017 @ Hambys Creek
13	32.0	-SR 1457 @ Swearing Creek
14	34.4	*NC 8 @ Winston-Salam SB RR
15	48.1	SR 1493 @ Huffmans Creek
16	28.4	I-85 @ Southern RR (Rowan Coilin)
17	49.8	NC 47 @ Flat Swamp Creek
18	N/A	SR 2205 @ Abbotts Creek

*In current Transportation Improvement Program FY 85-85
-US 52 project will replace bridge
N/A not available at this time

In Figure 7, a map of Davidson County is shown with the location of each deficient bridge in reference to the map index given.



DEFICIENT BRIDGES IN DAVIDSON COUNTY

FIGURE 7

DAVIDSON COUNTY

NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - PLANNING AND RESEARCH BRANCH
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

SCALE FOR ENLARGEMENTS

V. Thoroughfare Plan

The recommended thoroughfare plan for Davidson County is shown in Figure 8. Elements of the plan are initially classified as urban or rural. The areas near Lexington and Thomasville are delineated as urban thoroughfare planning areas since mutually approved thoroughfare plans are in effect for these municipalities.

Only major thoroughfares are shown within the urban planning area. This was necessary due to the limited detail that could be shown.

Elements of the Davidson County Plan are as follows:

Principal Arterials

I-85 - South of Lexington to Guilford County

US 52 - (Under Construction), Lexington to Welcome

Minor Arterials

US 64 East - from Lexington to Randolph County; the proposed improvement is to widen to a four lane urban section from eastern corporate limits of Lexington to SR 2010 (Holly Grove Road).

US 64 West - from Lexington to Davie County

Collector Road System

The rural collector routes serve primarily intra-county travel. The major collector roads supplement the arterial system by providing an interconnecting network between smaller population centers and the arterial system. The minor collector roads collect traffic from the local roads and carry it to a higher system facility. Major and minor collector roads of Davidson County are as follows:

Major Collector Roads

1. NC 150
2. NC 8 (US 52 Bus. N.) - It is recommended that this section of highway from the northern corporate limits of Lexington to SR 1412 be widened to a five lane urban section.
3. NC 8 South - This section of highway is recommended to be brought up to 2 lane rural standards from NC 49 to NC 47.

4. NC 47 - Construct overpass on NC 47 at Southern Railway at Linwood.
5. NC 109 N. - It is recommended that the section of highway from northern corporate limits of Thomasville to the Forsyth County line be constructed as a four lane divided facility on new location.
6. NC 109 S. - The section from US 64 east to south of Thomasville near SR 2067 (Lambeth Rd.) should be constructed as a four lane divided facility.
7. US 29-70
8. SR 1002
9. SR 2010
10. SR 2205 - It is recommended that the section of highway between Talbert Blvd. and I-85 be brought up to five lane urban section and the section of highway between I-85 and SR 2247 be brought up to two lane rural standards.
11. SR 1798 (Old Greensboro Rd.)
12. SR 1741 (Wallburg-Hight Point Rd.)

Minor Collector Roads

The following roads are classified as minor collectors and require minor widening for safety as listed in Appendix A, Table 1.

1. SR 2304 (Parks Road)
2. SR 2522 (Handy Road)
3. SR 2501 (S. Main Street Extension)
4. SR 2351 (Flat Swamp Road)
5. SR 2255 (Hedrick Mill Road)
6. SR 2248 (Allred Road)
7. SR 2104 (Cunningham Brick Road)
8. SR 2123 (National Highway)
9. SR 1700 (Friendship-Ledford Road)
10. SR 2928 (Miller Road)
11. SR 1738 (Westover Drive)
12. SR 1750
13. SR 1744 (Mock Road)
14. SR 1802 (Midway School Road)
15. SR 1813 (Ridge Road)
16. SR 1499 (Enterprise Road)
17. SR 1508 (Hickory Tree Road)
18. SR 1510 (N. Payne Road)
19. SR 1505 (Payne Road)
20. SR 1481-1472 (Welcome-Arcadia Rd.-Dr. Zimmerman Rd.)
21. SR 1468-1457 (Center Church Road-Arnold Road)
22. SR 1485-1495 (Hampton Road-Muddy Creek Road)
23. SR 1435-1186 (Becky Hill Rd.-Koontz Rd.)
24. SR 1192 (Old US 64 west)
25. SR 1208 (Mt. Carmel Road)
26. SR 1213 (Tyro Road)
27. SR 1147 (Old 29-70 South)
28. NC 47 (W. of NC 8)
29. SR 1155 (Swicegood Road)
30. SR 1104 (Central Carolina Boat Club Rd.)

FIGURE 8

DAVIDSON COUNTY
THOROUGHFARE PLAN

PRINCIPAL ARTERIALS	EXISTING	PROPOSED
INTERSTATE		
OTHER		
MINOR ARTERIALS		
MAJOR COLLECTORS		
MINOR COLLECTORS		
URBAN MAJOR THOROUGHFARE		
URBAN FREEWAY OR EXPRESSWAY		
URBAN THOROUGHFARE PLANNING AREA BOUNDARY		

DAVIDSON COUNTY

NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS – PLANNING AND RESEARCH BRANCH

SCALE

SCALE FOR ENLARGEMENTS

VI. IMPROVEMENT PRIORITIES

An evaluation of the North Carolina highway program from administrative, historical, and financial perspectives indicates the following objectives are of greatest importance:

- To improve the North Carolina arterial system to reduce travel costs and improve travel service between urban centers.
- To improve the level of service and safety of all roads and highways on the State system in a cost effective manner.
- To encourage economic development.
- To preserve the natural and human environment.
- To allocate funds to projects in a fair and equitable way.

(1) User benefits, (2) cost, (3) probability that a project will stimulate economic development, (4) quantification of environmental impacts, and (5) relationship of a project to the State arterial system provide a basis for evaluating projects as to how well they meet the objectives.

User benefits include cost savings resulting from an improvement project through reduction in vehicle operating costs, travel time costs, and accident costs. The estimated through travel served by a project provides a measure of the importance of a project to the State arterial system. Heavier volumes of through traffic are generally found on the more important facilities.

Estimation of environmental impacts of a project is one of the more difficult evaluations. Environmental factors usually considered in highway project evaluation can be divided into three major categories--physical, social and/or cultural, and economic environmental considerations (Table 7). Many of these are accounted for when a project is evaluated with respect to user benefits, cost, and economic development potential. However, thirteen environmental factors are generally not considered in these evaluations. They are the environmental impacts of a project on (1) air quality (2) water resources, (3) soils and geology, (4) wildlife, (5) vegetation, (6) neighborhoods, (7) noise, (8) educational facilities, (9) churches, (10) park and recreational facilities, (11) historic sites and landmarks, (12) public health and safety, and (13) aesthetics. The summation of both positive and negative impact probabilities with respect to these factors provides a measure of the relative environmental impact of a project.

Table 7

Environmental considerations		
Physical Environment	Social and/or Cultural Environment	Economic Environment
Air quality	Housing	Businesses
Water resources	Neighborhoods	Employment
Soils and geology	Noise	Economic development
Wildlife	Education facilities	Public utilities
Vegetation	Churches	Transportation costs
	Park and recreational facilities	Capital costs
	Public health and safety	Operation and maintenance costs
	National defense	
	Aesthetics	

The evaluation of the proposed Davidson County projects with respect to user benefits, estimated costs, probability that economic development will be stimulated, environmental impact, and through travel service is given in Table 8.

Primary and Secondary Highway System

Recommended priorites for construction and the estimated costs (in 1983 dollars) are shown in Table 9. The recommended priorities are based on needs, anticipated future traffic volumes, and the technical data developed in this report. These projects are placed in three priority groups in order of probable need.

Since conditions are constantly changing with time, these priorities should be reevaluated periodically by the County and Division Engineer.

Other desirable improvements are the upgrading of the County's unpaved and narrow collectors. Although adequate from a capacity standpoint, the poor operational characteristics of these facilties will make improvements desirable to enhance their safety and functional design.

Table 8

Benefits Evaluation of Davidson County Projects

Project Description	User Benefits ($1000)	Cost ($1000)	Economic Development Potential Probability	Environmental Impact Probability	2005 Through Traffic ADT
1. NC 8 South, NC 49 to SR 1130	36,000	C 5400 R 500	.62	+ .75 - .45	250
2. NC 8 South, SR 1130 to SCL Lexington	5,800	C 1000 200	.62	+ .65 -.45	250
3. NC 109, NCL Thomasville to Forsyth County	12,084	C 6700 R 4800	.28	+.45 -.30	200
4. NC 109, US 64 to SR 2067	9,116	C 5000 R 3600	.28	+ .45 - .10	200
5. US 52 (NC 8 North), NCL Lexgtn. to near New US 52 Interchange	12,600	C 500 R 600	.35	+ .50 - .20	450
6. SR 2205 (Old US 64), I-85 to SR 2247	400	C 50 R 40	.2	+ .30 - .10	-
7. US 64 E, ECL Lexgtn. to SR 2010	20,900	C 60	.54	+0.40 -0.20	800

TABLE 9

IMPROVEMENT PRIORITIES AND COST ESTIMATES

	ROUTE & SECTION	Recommended Cross Section	COST ESTIMATES Constr.	ROW	Total
	PRIORITY ONE:				
1.	NC 8 S, NC 49 to NC 47	2 lanes rural	5,000	0	5,000
2.	NC 8 S, NC 47 to SCL Lexgtn.	4 lanes urban	1,400	200	1,600
	PRIORITY TWO:				
1.	NC 109, US 64 to SR 2067 (Lambeth Rd.)	4 lanes divided	4,900	2,400	7,300
2.	NC 109, NCL Thomvl. to Forsyth Co. Line	4 lanes divided	6,800	6,000	12,800
3.	US 52 (NC 8N.), NCL Lexgtn. to near New US 52 Interchange	4 lanes urban	500	600	1,100
	PRIORITY THREE:				
1.	SR 2205, I-85 to SR 2247 (Rhodes Rd.)	2 lanes rural	50	35	85
2.	US 64 E, ECL Lexgtn. to SR 2010 Holly Grove Rd.	4 lanes urban	600	0	600

Bridge Replacement Priorities

The following deficient bridges were placed in three priorites groups based on computer data information supplied by the Bridge Maintenance Unit of the North Carolina Division of Highways. Data such as remaining life, length, width and sufficiency rating were used to determine the priorities as given below in Table 10.

TABLE 10

IMPROVEMENT PRIORITIES FOR DEFICIENT BRIDGES IN DAVIDSON CO.

Priority 1	Estimated Replacement Cost($1983)
1. SR 1700 @ Creek	2,010,000
2. SR 1755 @ Creek	610,600
3. SR 1700 @ Creek	335,400
4. SR 1457 @ Swearing Creek	297,600
5. SR 1800 @ Rich Creek	1,449,600
6. SR 1493 @ Huffmans Creek	345,600
Priority 2	
1. SR 1738 @ Rich Creek	455,800
2. SR 1477 @ Reedy Creek	352,600
3. SR 2005 @ Rich Creek	566,400
4. SR 2017 @ Hambys Creek	821,750
5. NC 8 @ Winston-Salem SB RR	1,884,000
Priority 3	
1. SR 1800 @ Rich Creek	1,545,600
2. I-85 @ Southern RR	3,220,000
3. SR 1004 @ Swearing Creek	1,171,200
4. SR 1485 @ Muddy Creek	1,210,000
5. I-85 @ Southern RR	1,171,200
6. NC 47 @ Flat Swamp Creek	1,092,000

VII. IMPLEMENTATION

There are several tools which are available for use by a county to assist in the implementation of a Thoroughfare Plan. They are as follows:

State-County Adoption of Thoroughfare Plan

If requested, the Department of Transportation in cooperation with a county will cooperatively develop and mutually approve a County Thoroughfare plan. The mutually approved plan would serve as a guide to the Department of Transportation in the development of the road and highway system of the County. The approval of the plan by the County would enable standard road regulations and land use controls to be effectively used to assist in the implementation of the plan.

Subdivision Controls

The subdivision regulations require every subdivider to submit to the county planning commission a plan of his proposed subdivision and requires that the subdivision be constructed to certain standards. Through this process, it is possible to require the subdivision streets to conform to the Thoroughfare plan and to reserve or protect necessary rights-of-way for projected roads and highways that are to become a part of the Thoroughfare plan. The construction of subdivision streets to adequate standards would reduce maintenance costs and would facilitiate the transfer of the streets to the State Highway System. Appendix B outlines the recommended design standards.

Land Use Controls

Land use regulations are an important tool in that they will regulate future land development and minimize undesirable development along roads and highways. The land use regulatory system can improve highway safety by requiring sufficient building setbacks to provide for adequate sight distances and by requiring off-street parking.

Funding

The majority of the highway improvements are scheduled and funded by the Transportation Improvement Program. The Board of Transportation regularly conducts public meetings to obtain input from the public of their needs for highway improvements.

However, not all roadway improvements are covered by this procedure. Nearly all secondary road work is done on a county by county basis. These funds (county construction account) are used to pave unimproved roads, widen roadways, stabilize dirt roads, make minor alignment improvements, and even construct short connectors when appropriate. The county commissioners are encouraged to work with the Division Engineer when the county's priority list is developed. Many of the minor improvements recommended may be realized by using the county's construction account funds and cooperatively developing the county's priority list with the Division Engineer.

WIB/wp

APPENDICES

APPENDIX A

THOROUGHFARE TABULATIONS

Typical Cross Sections

Typical cross sections recommended by the Thoroughfare Planning Unit are shown in Appendix A, Figure 1, and listed in Appendix A, Table 1.

Cross section "A" is typical for controlled access freeways. The 46 foot grassed median is the minimum desirable median width, but there could be some variation from this depending upon design considerations. Slopes of 8:1 into 3 foot drainage ditches are desirable for traffic safety. Right-of-way requirements would typically vary upward from 250 feet depending upon cut and fill requirements.

Cross section "B" is typical for four lane divided highways in rural areas which may have only partial or no control of access. The minimum median width for this cross section is 30 feet, but a wider median is desirable. Design requirements for slopes and drainage would be similar to cross section "A", but there may be some variation from this depending upon right-of-way constraints.

Cross section "C", seven lane urban, and cross section "D", five lane urban, are typical for major thoroughfares where frequent left turns are anticipated as a result of abutting development or frequent street intersections.

Cross sections "E" and "F" are used on major thoroughfares where left turns and intersecting streets are not as frequent. Left turns would be restricted to a few selected intersections.

Cross section "G" is recommended for urban boulevards or parkways to enhance the urban environment and to improve the compatibility of major thoroughfares with residential areas. A minimum median width of 24 feet is recommended with 30 feet being desirable.

Typical cross section "H" is recommended for major thoroughfares where projected travel indicates a need for four travel lanes; but traffic is not excessively high, left turning movements are light, and right-of-way is restricted. An additional left turn lane would probably be required at major intersections.

Thoroughfares which are proposed to function as one-way traffic carriers would typically require cross section "I". Cross section "J" and "K" are usually recommended for minor throughfares since these facilities usually serve both land

service and traffic service functions. Cross section "J" would be used on those minor throughfares where parking on both sides is needed as a result of more intense development.

Cross section "L" is used in rural areas or for staged construction of a wider multilane cross section. On some thoroughfares projected traffic volumes may indicate that two travel lanes will adequately serve travel for a considerable period of time.

The curb and gutter urban cross sections all illustrate the sidewalk adjacent to the curb with a buffer or utility strip between the sidewalk and the minimum right-of-way line. This permits adequate setback for utility poles. If it is desired to move the sidewalk further away from the street to provide additional separation for pedestrains or for aesthetic reasons, additional right-of-way must be provided to insure adequate setback for utility poles.

Right-of-ways shown for the typical cross sections are the minimum rights-of-way required to contain the street, sidewalks, utilities, and drainage facilities. Cut and fill requirements may require either additional right-of-way or construction easements. Obtaining construction easements is becoming the more common practice for urban thoroughfare construction.

If there is sufficient bicycle travel along the thoroughfare to justify a bicycle lane or bikeway, additional right-of-way may be required to contain the bicycle facilities. The North Carolina Bicycle Facility and Program Handbook[1] should be consulted for design standards for bicycle facilities.

Recommended typical cross sections for thoroughfares were derived on the basis of projected traffic, existing capacities, desirable levels of service and available right-of-way. The recommended typical cross sections for the thoroughfares are given in Appendix B along with other pertinent information.

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[1]The North Carolina Bicycle Facility and Program Handbook, Barton-Aschman Associates, Inc., April, 1975.

APPENDIX A
DAVIDSON COUNTY THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

FACILITY & SECTION	EXISTING X-SECTION DIST MI	RDWY FT	ROW FT	CAPACITY CURRENT (FUTURE)	1982 ADTS	2005 ADTS	RECOMMENDED X-SECTION RDWAY (ULT)	ROW (ULT)
I 85(RANDOLPH CO-US 29/70)	30.00	72	400	68800	18000	55000	ADQ	ADQ
US 29/70 (TEMP I 85)								
ROWAN CO.-US 29-70 B	7.34	48	260	52000	20300	42500	ADQ	ADQ
US 29-70 B-US 52-NC 8	3.73	48	260	52000	38400	42500	ADQ	ADQ
US 52-NC 8-E CL LEXGTN	1.03	48	480	52000	28500	42500	ADQ	ADQ
E CL LEXGTN-NC 109	8.21	48	260	52000	24500	42500	ADQ	ADQ
NC 109-RANDOLPH CO.	2.80	48	260	52000	26900	42500	ADQ	ADQ
US 52 (COMMON NC 8 NORTH)								
N CL LEXGTN-SR 1412	.88	22	100	6450	14900	22000	B	200
SR 1412-SR 1499	6.42	48	200	52000	9900	22000	ADQ	ADQ
SR 1499-FORSYTH CO.	4.64	48	200	52000	9000	22000	ADQ	ADQ
US 64 WEST								
DAVIE CO.-NC 150	3.52	24	150	5200	3400	6200	B	200
NC 150-SR 1237	2.97	24	150	5200	4100	6200	B	200
SR 1237-SR 1239	.97	36	150	12000	5500	8500	H	ADQ
SR 1239-W CL LEXGTN	.07	48	150	52000	6100	12500	ADQ	ADQ
US 64 EAST								
E CL LEXGTN-SR 2010	1.21	24	150	5200	10000	17500	H	ADQ
SR 2010-NC 109	7.56	24	150	5200	4000	6200	H	200
NC 109-RANDOLPH CO.	8.54	24	150	5200	3000	6500	H	200
NC 8 SOUTH								
MONTGOMERY CO.-NC 49	1.67	24	200	5200	3400	5200	ADQ	ADQ
NC 49-SR 2351	7.45	20	100	4000	1250	4200	L	ADQ
SR 2351-HIGH ROCK LAKE	4.14	20	100	4000	1250	4200	L	ADQ
HIGH ROCK LAKE-SR 1130	8.78	24	60	5200	2500	5200	L	ADQ
SR 1130-SR 1254	1.81	24	60	5200	4000	7500	H	70
SR 1254-S CL LEXGTN	.99	24	60	5200	8600	12500	H	70
NC 47								
RANDOLPH CO.-NC 109	.30	20	60	5770	1300	2600	(L)	(100)
SR 2520-SR 2515	1.55	24	60	7500	2540	4000	ADQ	ADQ
SR 2515-SR 2501	1.85	44	60	24000	4220	8600	ADQ	ADQ
SR 2501-N CL DENTON	.59	18	60	12000	1880	3200	ADQ	ADQ
N CL DENTON-SR 2304	9.94	18	60	5200	1780	3200	(L)	(100)
SR 2304-NC 8	3.10	18	60	5200	1780	3200	(L)	(100)
NC 49								
RANDOLPH CO.-NC 109	2.21	24	100	5200	2800	4200	ADQ	ADQ
NC 109-STANLEY CO.	6.56	24	100	5200	3900	5200	ADQ	ADQ
NC 62								
RANDOLPH CO.-E CL THOMVL	1.35	20	60	5200	2900	4800	(L)	(100)

APPENDIX A CONT'D

DAVIDSON COUNTY THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

FACILITY & SECTION	EXISTING X - SECTION DIST MI	RDWY FT	ROW FT	CAPACITY CURRENT (FUTURE)	1982 ADTS	2005 ADTS	RECOMMENDED X - SECTION RDWAY (ULT)	ROW (ULT)
NC 109								
RANDOLPH CO.-NC 49	3.62	20	100	5770	1750	3000	(L)	(100)
NC 49-SR 2528	.45	24	100	7500	2000	3200	ADQ	ADQ
SR 2528-SR 2511	4.74	20	60	5770	3200	5200	(L)	(100)
SR 2511-N CL DENTON	.36	52	60	24600	5300	7500	ADQ	ADQ
N CL DENTON-US 64	9.62	24	60	7500	5500	7500	ADQ	ADQ
US 64-SR 2067	5.72	24	60	7500	7000	10200	B	200
SR 2067-ROYAL OAKS	1.72	64	80	52000	12300	18200	ADQ	ADQ
ROYAL OAKS-GUILFORD ST.	.91	39	60	18000	10900	15000	ADQ	ADQ
GUILFORD ST.-N CL THOMVL.	1.33	36	60	18000	6500	9500	ADQ	ADQ
N CL THOMVL.-FORSYTH CO.	9.99	20	60	5770	5900	8000	B	200
NC 150								
I 85(TEMP)-SR 1176	6.61	20	60	5770	2500	4200	(L)	(100)
SR 1176-US 64	2.60	20	60	5770	4300	5500	(L)	(100)
US 64-SR 1493	5.25	20	60	5770	5900	7800	B	200
SR 1493-FORSYTH CO.	7.12	20	60	5770	10200	14500	B	200
SR 1001								
RANDOLPH CO.-SR 2414	3.16	22	60	6500	1200	2000	(L)	(100)
SR 1002								
SR 2501-W CL DENTON	.57	24	60	7500	1100	1600	(L)	(100)
W CL DENTON-ROWAN CO.	6.90	18	60	5200	700	1200	(L)	(100)
SR 1155								
NC 150 S-NC 150 N	4.40	18	60	5200	1000	1400	(L)	(100)
SR 1457								
SR 1468-NC 8	3.10	18	60	5200	1000	1300	(L)	(100)
SR 1468								
NC 150-SR 1453	2.80	16	60	4500	700	1250	(L)	(100)
SR 1453-SR 1457	.20	18	60	5200	700	1250	(L)	(100)
SR 1472								
SR 1481-SR 1479	.80	18	60	5200	700	1000	(L)	(100)
SR 1473								
SR 1502-US 52	1.00	18	60	5200	250	350	(L)	(100)
SR 1477								
SR 1468-SR 1441	1.30	18	60	5200	300	450	(L)	(100)
SR 1479								
SR 1472-SR 1502	.70	18	60	5200	300	600	(L)	(100)
SR 1481								
SR 1493-SR 1472	1.60	18	60	5200	350	450	(L)	(100)
SR 1485								
FORSYTH CO.-SR 1495	4.10	16	60	4500	400	600	(L)	(100)
SR 1493								
FORSYTH CO.-NC 150	4.60	16	60	4500	400	600	(L)	(100)

APPENDIX A CONT'D

DAVIDSON COUNTY THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

FACILITY & SECTION	EXISTING X - SECTION DIST MI	RDWY FT	ROW FT	CAPACITY CURRENT (FUTURE)	1982 ADTS	2005 ADTS	RECOMMENDED X - SECTION RDWAY (ULT)	ROW (ULT)
SR 1495								
NC 150-SR 1485	2.00	16	60	4500	300	600	(L)	(100)
SR 1498								
SR 1493-SR 1495	2.00	20	60	5750	140	250	(L)	(100)
SR 1499								
NC 150-US 52	6.31	18	60	5200	650	1000	(L)	(100)
SR 1700								
SR 1711-SR 1798	5.20	18	60	5200	470	600	(L)	(100)
SR 1711								
SR 2932-FORSYTH CO.	5.60	18	60	5200	950	1400	(L)	(100)
SR 1721								
SR 1802-SR 1722	1.70	20	60	5750	500	750	(L)	(100)
SR 1722								
SR 1721-SR 1716	.20	20	60	5750	300	400	(L)	(100)
SR 1735								
SR 1741-SR 1982	1.70	18	60	5200	200	275	(L)	(100)
SR 1738								
SR 1735-GUILFORD CO.	.80	20	60	5750	400	500	(L)	(100)
SR 1741								
SR 1755-SR 109	6.00	20	60	5750	600	1000	(L)	(100)
SR 1744								
SR 1733-SR 1755	3.50	16	60	4500	330	600	(L)	(100)
SR 1755								
NC 109-SR 1976	2.00	18	60	5200	550	750	(L)	(100)
SR 1976-SR 1761	.90	16	60	4500	1200	1800	(L)	(100)
SR 1761-SR 1757	.60	24	60	7500	1700	2200	ADQ	ADQ
SR 1757-GUILFORD CO.	3.40	18	60	5200	1700	2200	(L)	(100)
SR 1756								
NC 109-SR 1755	.90	24	60	7500	1000	1200	ADQ	ADQ
SR 1755-SR 1741	3.10	18	60	5200	700	1000	(L)	(100)
SR 1763								
SR 1776-GUILFORD CO.	1.80	18	60	5200	400	500	(L)	(100)
SR 1772								
NC 109-US 29A/70A	2.42	24	60	7500	2300	4200	ADQ	ADQ
US 29A/70A-SR 1700	.77	18	60	5200	900	1200	(L)	(100)
SR 1776								
SR 1772-SR 1763	1.30	20	60	5750	720	1000	(L)	(100)

APPENDIX A CONT'D

DAVIDSON COUNTY THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

FACILITY & SECTION	EXISTING X-SECTION DIST MI	RDWY FT	ROW FT	CAPACITY CURRENT (FUTURE)	1982 ADTS	2005 ADTS	RECOMMENDED X-SECTION RDWAY (ULT)	ROW (ULT)
SR 1798								
NC 109-US 29/70	8.24	18	100	4500	1300	2000	(L)	(100)
SR 1800								
NC 109-SR 1802	2.80	18	60	5200	850	1100	(L)	(100)
SR 1802								
SR 2932-SR 1800	4.30	18	60	5200	850	1100	(L)	(100)
SR 1813								
SR 1998-SR 1844	7.50	18	60	5200	850	1100	(L)	(100)
SR 1982								
SR 1735-FORSYTH CO.	.30	38	60	18000	300	400	ADQ	ADQ
SR 2005								
SR 2123-SR 2010	2.80	16	60	4500	800	1100	(L)	(100)
SR 2010								
SR 2184-SR 2118	1.80	18	60	5200	1500	2000	(L)	(100)
SR 2118-US 64	5.95	20	60	5750	1700	2200	(L)	(100)
SR 2017								
SR 2010-SR 2020	1.80	20	60	5750	150	200	(L)	(100)
SR 2020								
SR 2123-SR 2010	1.90	16	60	4500	250	300	(L)	(100)
SR 2123								
US 29/70-SR 2020	1.40	20	60	5750	900	1200	(L)	(100)
SR 2205								
I-85-SR 2247	.20	18	60	5200	5000	7500	L	(100)
SR 2247								
SR 2205-SR 2248	2.20	20	60	5750	700	1000	(L)	(100)
SR 2248								
SR 2247-NC 48	1.60	16	60	4500	650	750	(L)	(100)
SR 2304								
NC 8-NC 47	6.20	16	60	4500	550	675	(L)	(100)
SR 2351								
NC 47-W CL DENTON	.42	44	60	24000	1080	1400	ADQ	ADQ
SR 2501								
SR 1002-SR 2522	5.40	18	60	5200	300	400	(L)	(100)
SR 2517								
NC 47-SR 1001	1.70	20	60	5750	300	400	(L)	(100)
SR 2522								
SR 2501-RANDOLPH CO.	4.60	16	60	4500	200	250	(L)	(100)

APPENDIX B

RECOMMENDED DEFINITIONS AND DESIGN STANDARDS FOR SUBDIVISION ORDINANCES

DEFINITIONS:

I. Streets and Roads:

A. Rural Roads

1. Principal Arterial - A rural link in a network of continuous routes serving corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel and existing solely to serve traffic. This network would consist of Interstate routes and other routes designated as principal arterials.

2. Minor Arterial - A rural link in a network joining cities and larger towns and providing intrastate and intercounty service at relatively high overall travel speeds with minimum interference to through movement.

3. Major Collector - A road which serves major intracounty travel corridors and traffic generators and provides access to the Arterial system.

4. Minor Collector - A road which provides service to small local communities and links the locally important traffic generators with their rural hinterland.

5. Local Road - A local road that serves primarily to provide access to adjacent land and for travel over relatively short distances.

B. Urban Streets

1. Major Thoroughfares - Major thoroughfares consist of Interstate, other freeway, expressway, or parkway links, and major streets that provide for the expeditious movement of high volumes of traffic within and through urban areas.

2. Minor Thoroughfares - Minor thoroughfares are important streets in the city system and perform the function of collecting traffic from local access streets and carrying it to the major thoroughfare system. Minor thoroughfares may be used to supplement the major thoroughfare system by facilitating a minor through-traffic movement and may also serve abutting property.

3. Local Street - A local street is any link not on a higher-order urban system and serves primarily to provide direct access to abutting land and access to higher systems.

C. Specific Type Rural or Urban Streets

1. Freeway, expressway, or parkway - Divided multilane roadways designed to carry large volumes of traffic at relatively high speeds. A freeway is a divided highway providing for continuous flow of vehicles with no direct access to abutting property or streets and with access to selected crossroads provided via connecting ramps. An expressway is a divided highway with full or partial control of access and generally with grade separations at major intersections. A parkway is a highway for noncommercial traffic, with full or partial control of access, and usually located within a park or a ribbon of parklike development.

2. Residential Collector Street - A local access street which serves as a connector street between local residential streets and the thoroughfare system. Residential collector streets typically collect traffic from 100 to 400 dwelling units.

3. Local Residential Street - Cul-de-sacs, loop streets less than 2,500 feet in length, or streets less than one mile in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.

4. Cul-de-sac - A short street having but one end open to traffic and the other end being permanently terminated and a vehicular turn around provided.

5. Frontage Road - A local street or road that is parallel to a full or partial access controlled facility and functions to provide access to adjacent land.

6. Alley - A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the back side of properties otherwise abutting on a street.

II. Property

A. Building Setback Line - A line parallel to the street in front of which no structure shall be erected.

B. Easement - A grant by the property owner for use by the public, a corporation, or person(s), of a strip of land for a specific purpose.

C. Lot - A portion of a subdivision, or any other parcel of land, intended as a unit for transfer of ownership or for development or both. The word "lot" includes the words "plat" and "parcel".

1. Corner Lot - A lot abutting upon two streets at their intersection.

2. Double-Frontage Lot - A continuous (through) lot which is accessible from both of the parallel streets upon which it fronts.

3. Reverse-Frontage Lot - A continuous (through) lot which is accessible from only one of the parallel streets upon which it fronts.

III. Subdivision

A. Subdivider - Any person, firm, corporation or official agent thereof, who subdivides or develops any land deemed to be a subdivision.

B. Subdivision - All divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, whether immediate or future, of sale or building development, and all divisions of land involving the dedication of a new street or a change in existing streets; provided, however, that the following shall not be included within this definition nor subject to these regulations: (1) the combination or recombination of portions of previously platted lots where the total number of lots is not increased

and the resultant lots are equal to or exceed the standards contained herein; (2) the division of land into parcels greater than five acres where no street right-of way dedication is involved; (3) the public acquisition by purchase of strips of land for the widening or opening of streets; (4) the division of a tract in single ownership whose entire area is no greater than two acres into not more than three lots, where no street right-of-way dedication is involved and where the resultant lots are equal to or exceed the standards contained herein.

C. Dedication - A gift, by the owner, of his property to another party without any consideration being given for the transfer. Since a transfer of property is involved, the dedication is made by written instrument and is completed with an acceptance.

D. Reservation - A reservation of land does not involve any transfer of property rights. It simply constitutes an obligation to keep property free from development for a stated period of time.

Design Standards

I. Streets and Roads:

The design of all streets and roads within _____ shall be in accordance with the accepted policies of the North Carolina Department of Transportation, Division of Highways, as taken or modified from the American Association of State Highway Officials' (AASHO) manuals.

The provision of street rights-of-way shall conform and meet the requirements of the thoroughfare plan for _____ as adopted by the _____ and the North Carolina Department of Transportation.

The proposed street layout shall be coordinated with the existing street system of the surrounding area. Normally the proposed streets should be the extension of existing streets if possible.

The urban planning area shall consist of that area within the urban planning boundary as depicted on the mutually adopted _____ Thoroughfare Plan. The rural planning area shall be that area outside the urban planning boundary.

A. Right-of-Way Widths: Right-of-way widths shall not be less than the following and shall apply except in those cases where right-of-way requirements have been specifically set out in the Thoroughfare Plan.

		Min. Right of Way, Ft.
1.	Rural	
a.	Principal Arterial	
	Freeways	350
	Other	200
b.	Minor Arterial	100
c.	Major Collector	100
d.	Minor Collector	100
e.	Local Road	*60

*The desirable minimum right-of-way is 60 feet. If curb and gutter is provided, 50 feet of right-of-way is adequate on local residential streets.

		Min. Right of Way, Ft.
2.	Urban	
a.	Major Thoroughfare Other than Freeway and Expressway	90
b.	Minor Thoroughfare	70
c.	Local Street	*60
d.	Cul-de-sac	**Variable

The subdivider will only be required to dedicate a maximum of 100 feet of right-of-way. In cases where over 100 feet of right-of-way is desired, the subdivider will be required only to reserve the amount in excess of 100 feet. In all cases in which right-of-way is sought for an access controlled facility, the subdivider will only be required to make a reservation.

A partial width right-of-way, not less than sixty (60) feet in width, may be dedicated when adjoining undeveloped property that is owned or controlled by the subdivider; provided that the width of a partial dedication be such as to permit the installation of such facilities as may be necessary to serve abutting lots. When the said adjoining property is subdivided, the remainder of the full required right-of-way shall be dedicated.

B. Street Widths: Widths for street and road classifications other than local shall be as required by the Thoroughfare Plan. Width of local roads and streets shall be as follows:

1. Local Residential
   Curb and gutter section 26 feet, to face of curb
   Shoulder section - 20 feet to edge of pavement, 4 foot shoulders

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*The desirable minimum right-of-way is established as 60 feet. If curb and gutter is provided, 50 feet of right-of-way is adequate.

**The right-of-way dimension will depend on radius used for vehicular turn-around. Distance from edge of pavement of turn around to right-of-way should not be less than distance from edge of pavement to right-of-way on street approaching turn-around.

2. Residential Collector
   Curb and gutter section 34 feet, face to face of curb
   Shoulder Section 20 feet to edge of pavement, 6 foot shoulders

C. Geometric Characteristics: The standards outlined below shall apply to all subdivision streets proposed for addition to the State Highway System or Municipal Street System. In cases where a subdivision is sought adjacent to a proposed thoroughfare corridor, the requirements of dedication and reservation discussed under Right-of-Way shall apply.

1. Design Speed

The design speeds for subdivisions type streets shall be:

	Desirable	(Minimum)		
		Level	Rolling	Mountainous
Rural				
Minor Collector Roads	60	(50)	(40)	(30)
Local Roads including Residential Collectors and Local Residential	50	(50)*	(40)*	(30)*
Urban				
Major Thoroughfares Other than Freeway or Expressway	60	(50)	(50)	(50)
Minor Thoroughfares	60	(50)	(40)	(40)
Local Streets	40	(40)**	(30)**	(20)**

*Based on projected annual average daily traffic of 400-750. In cases where road will serve a very limited area and small number of dwelling units, minimum design speeds can be reduced further.

**Based on projected annual average daily traffic of 50-250.

2. Maximum and Minimum Grades

a. The maximum grades in percent shall be:

Design Speed	Level	Rolling	Mountainous
60	3	4	6
50	4	5	7
40	5	6	8
30		9	10
20			12

b. A minimum grade for curbed streets normally should not be less than 0.5%, a grade of 0.35% may be allowed where there is a high type pavement accurately crowned and in areas where special drainage conditions may control.

c. Grades for 100 feet each way from intersections should not exceed 5%.

d. For streets and roads with projected annual average daily traffic less than 250, short grades less than 500 feet long, may be 150% greater.

3. Minimum Sight Distances

In the interest of public safety, no less than the minimum sight distance applicable shall be provided in every instance. Vertical curves that connect each change in grade shall be provided and calculated using the following parameters. (General practice calls for vertical curves to be multiples of 50 feet. Calculated lengths shall be rounded up in each case):

Design Speed, MPH	20	30	40	50	60
Stopping Sight Distance -					
Min. Distance, Ft.	150	200	275	350	475
Des. Distance, Ft.	150	200	300	450	650
Min. K* Value For:					
Min. Crest Curve	16	28	55	85	160
Des. Crest Curve	16	28	65	145	300
Min. SAG Curve	24	35	55	75	105
Des. SAG Curve	24	35	60	100	155
Passing Sight Distance -					
Min. Passing Distance, Feet (2 lane)		1100	1500	1800	2100
Min. K* Value For Crest Vertical Curve		365	686	985	1340

Sight distance provided for stopped vehicles at intersections should be in accordance with, "A Policy on Geometric Design of Rural Highways".

4. The following table shows the maximum degree of curve and related maximum superelevation for design speeds. The maximum rate of roadway superelevation (e) for rural roads wth no curb and gutter is .08. The maximum rate of superelevation for urban streets with curb and gutter is .06 with .04 being desirable.

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*K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length in feet of the vertical curve which will provide minimum sight distance.

Design Speed MPH	Maximum e*	Minimum Radius (Rounded) Feet	Maximum Degree of Curve (Rounded) Degrees
20	.04	125	45.0
30	.04	300	19.0
40	.04	560	10.0
50	.04	925	6.0
60	.04	1410	4.0
20	.06	115	50.0
30	.06	275	21.0
40	.06	510	11.5
50	.06	830	7.0
60	.06	1260	4.5
20	.08	110	53.5
30	.08	250	23.0
40	.08	460	12.5
50	.08	760	7.5
60	.08	1140	5.0

*e = rate of roadway superelevation, foot per foot

D. Intersections

1. Streets shall be laid out so as to intersect as nearly as possible at right angles, and no street should intersect any other street at an angle less than sixty (60) degrees.

2. Property lines at intersections should be set so that the distance from the edge of pavement, of the street turnout, to the property line will be at least as great as the distance from the edge of pavement to the property line along the intersecting streets. This property line can be established as a radius or as a sight triangle. Greater offsets from the edge of pavement to the property lines will be required, if necessary, to provide sight distance for the stopped vehicle on the side street.

3. Off-set intersections are to be avoided unless exception is granted by the Divison of Highways for intersections involving the State Highway System, or the Planning Board for intersections involving only the municipal street system. Intersections which cannot be aligned should be separated by a minimum length of 200 feet between survey centerlines.

E. Cul-de-sacs

Cul-de-sacs, unless exception is granted by the local planning board, shall not be more than five hundred (500) feet in length. The distance from the edge of pavement on the vehicular turnaround to the right-of-way line should not be less than the distance from the edge of pavement to right-of-way line on the street approaching the turn-around. Cul-de-sacs should not be used to avoid connection with an existing street or to avoid the extension of an important street.

F. Alleys

1. Alleys shall be required to serve lots used for commercial and industrial purposes except that this requirement may be waived where other definite and assured provision is made for service access.

   Alleys shall not be provided in residential subdivisions unless necessitated by unusual circumstances.

2. The width of an alley shall be at least twenty (20) feet.

3. Dead-end alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turn-around facilities at the dead-end as may be approved by the Planning Board.

4. Sharp changes in alignment and grade shall be avoided.

G. Permits For Connection To State Roads

An approved permit is required for connection to any existing state system road. This permit is required prior to any construction on the street or road. The application is available at the office of the nearest District Engineer of the Divison of Highways.

H. Offsets To Utility Poles

Poles for overhead utilities should be located clear of roadway shoulders, preferably a minimum of at least 30 feet from the edge of pavement. On streets with curb and gutter, utility poles shall be set back a minimum distance of 6 feet from the face of curb.

I. Wheel Chair Ramps

In accordance with Chapter 136, Article 2A, §136-44.14, all street curbs in North Carolina being constructed or reconstructed for maintenance purposes, traffic operations, repairs, correction of utilities, or altered for any reason after September 1, 1973, shall provide wheelchair ramps for the physically handicapped at all intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

Wheelchair ramps and depressed curbs shall be constructed in accordance with details contained in the Department of Transportation, Divison of Highways, Publication entitled, "Guidelines, Curb Cuts and Ramps for Handicapped Persons".

J. Horizontal Width on Bridge Deck

1. The clear roadway widths for new and reconstructed bridges serving 2 lane, 2 way traffic should be as follows:

   a. Shoulder Section Approach

      i. Under 800 ADT Design Year

         Minimum 28 feet width face to face of parapets of rails or pavement width plus 10 feet, whichever is greater.

      ii. 800-2000 ADT Design Year

         Minimum 34 feet width face to face of parapets or rails or pavement width plus 12 feet, whichever is greater.

      iii. Over 2000 ADT Design Year

         Minimum 40 feet
         Desirable 44 feet width face to face of parapets or rails.

   b. Curbs and Gutter Approach

      i. Under 800 ADT Design Year

         Minimum 24 feet face to face of curbs.

ii. Over 800 ADT Design Year

Width of approach pavement measured face to face of curbs.

Where curb and gutter sections are used on roadway approaches, curbs on bridges shall match the curbs on approaches in height, in width of face to face of curbs, and in crown drop. The distance from face of curb to face of parapet or rail shall be 1'6" minimum, or greater if sidewalks are required.

2. The clear roadway widths for new and reconstructed bridges having 4 or more lanes serving undivided two-way traffic should be as follows:

   a. Shoulder Section Approach - Width of approach pavement plus width of usable shoulders on the approach left and right.
   Min. 8'
   Des. 10'

   b. Curb and Gutter Approach - Width of approach pavement measured face to face of curbs.

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